REMARKS

This is a full and timely response to the Office Action mailed February 9, 2007, submitted concurrently with a two month extension of time to extend the due date for response to July 9, 2007.

By this Amendment, claims 1, 2, 3, 6, 7, 8, 11 and 13 have been amended to more particularly define the present invention and/or to put the claims in better form in view of the Examiner's objection and rejection. Further, new claims 14-16 have been added to further protect specific embodiments of the present invention. Support for the claim amendments and new claims can be found throughout the specification and the original claims, see, for example, FIGs. 6 and 7. Thus, claims 1-16 are pending in this application.

In view of this amendment and the following remarks, Applicant believes that all pending claims are in condition for allowance. Reexamination and reconsideration in light of the above claims and the following remarks is respectfully requested.

Objection to the Abstract of the Disclosure

The Examiner has objected to the Abstract of the Disclosure because it exceeds 150 words in length. Applicant has amended to Abstract of the Disclosure in accordance with the Examiner's request.

Objection to the Specification

Applicant has reviewed the specification and effected minor corrections as per the Examiner's request. Applicant also hereby agrees to the Examiner's request to correct any additional errors which Applicant may become aware in the specification during the course of prosecution.

Objection to the Claims

Claim 13 is objected to for lacking proper antecedent basis for the recitation of "*said switch controlling circuit*". Applicant has amended claim 13 to depend on claim 8 in accordance with the Examiner's suggestion. Thus, withdrawal of this objection is respectfully requested.

Rejection under 35 U.S.C. §112

Claims 8 and 11 are rejected under 35 U.S.C. §112, second paragraph, for allegedly being indefinite. Applicant respectfully traverses this rejection. However, in the interest of expediting the prosecution of the present application, Applicant has amended claims 8 and 11 to address the Examiner's concerns. Thus, withdrawal of this rejection is respectfully requested.

Rejections under 35 U.S.C. §103

Claims 1-4 and 6 are rejected under 35 U.S.C. §103 as allegedly being unpatentable over Hironaka et al. (both U.S. Patent No. 6,677,589 and U.S. Patent Publication No. 2003/0047671) in view of Takada et al. (U.S. Patent No. 5,917,187) and North (U.S. Patent No. 6,081,558). Applicant respectfully traverses this rejection.

To establish a *prima facie* case of obviousness, the following three criteria must be satisfied. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. Here, in this case, based on Applicant's review of Hironaka et al. (both U.S. Patent No. 6,677,589 and U.S. Patent Application Publication No. 2003/0047671), Takada et al. and North, Applicant submits that the above criterias have not been satisfied.

The infrared detecting device of the claims is characterized by distributing "*the drive current to a part of said signal circuits based on the current from said fixed current source*" and distributing "*the drive current to the remaining part of said signal circuits based on the current from said variable current source; the part of said signal circuits including at least said I/V conversion circuit*". The signal circuits are located on the pathway from a pyroelectric element to output obtained from a signal of the pyroelectric element. That is, the signal circuits comprise an I/V conversion circuit, a voltage amplification circuit, a detection circuit and an output circuit. In an embodiment of the present invention, by distributing the drive current to the part of the signal circuits based on the current from the fixed current source, influence of current changeover in the

part can be excluded and therefore, the performance or behavior of the part can be kept in stable state. By distributing the drive current to the remaining part based on the current from the variable current source, current consumption of the remaining part can be reduced (see page 4, lines 6-11, of the specification). As a result, it is possible to reduce current consumption while keeping the performance or behavior of the circuits of the infrared detecting device in a stable state.

In contrast, the object detecting device of Hironaka et al. comprises a mode selector 80 that supplies voltage corresponding to mirror current(s) to each of an I/V converter 20, a voltage amplifier 30, a level monitor 50 and a control output generator 70 as shown in FIGs 1 and 2. The I/V converter 20 is supplied with voltage corresponding to mirror currents I_{23} and I_{24} of which levels are varied by switches 111-113. Similarly, the voltage amplifier 30 is supplied with voltage corresponding to mirror currents I_{33} and I_{34} of which levels are varied by switches 111-113. The level monitor 50 is supplied with voltage corresponding to mirror current I_{53} of which level is varied by switches 111-113. The control output generator 70 is supplied with voltage corresponding to mirror current I_{73} of which level is varied by switches 111-113. Thus, the device that supplies voltage varied by the switches to each part cannot obtain the advantages of the present invention. For example, influence of current changeover in the voltage amplifier 30 cannot be excluded and therefore the performance or behavior of the amplifier cannot be kept in a stable state.

The deficiencies in Hironaka et al. are not cured by the teachings and suggestions of North and Takada et al. North teaches an apparatus which provides an adaptive bias voltage V_{ADAPT} and a fixed reference bias voltage V_{FLX} to each of a comparator 58 and a buffer 60 as shown in FIG. 5. That is, V_{FLX} will maintain a minimum bias current level (see column 8, lines 35-36, of North). Therefore, even if the object detecting device of Hironaka et al. further comprises the circuit of North for providing V_{ADAPT} and V_{FLX} in addition to the circuit of Takada et al. that selectively amplifies the voltage signal of a pyroelectric detector based on frequencies around 1Hz to discriminate motion of a human, it cannot obtain the advantage of the present invention because V_{FLX} cannot exclude the influence of V_{ADAPT} changeover (variation). Furthermore, the only element taught by North that could be interpreted as similar to the I/V

conversion circuit is amplifier 54, (see column 5, lines 1-2, of North). However, this element is consistently taught as being provided with variable current I_{AGC} from the AGC control circuit **56**, (see column 5, line 9, to column 7, line 23, and Figs. 1-3, 5, and 8 of North), rather than a current from a fixed current source as recited in claim 1. Hence, it is clear that the infrared detecting device of the present claims is not taught or suggested based on the combined disclosures of Hironaka et al., North and Takada et al.

The Examiner has argued with regard to claim 2 that even though the references in combination only suggests the use of a single variable source, it would have been obvious to one skilled in the art to use multiple variable current sources instead of just a single variable current source since it has been held that the mere duplication of the essential working parts of a device involves only routine skill in the art. *In re Harza 274 F2.d 669, 124 USPQ 378 (CCPA 1960).* However, Applicant strongly disagrees with the Examiner in this regard.

The plurality of current sources in claim 2 is not a mere duplication of essential working parts as in *In re Harza.* As disclosed in Applicant's specification (see page 16, line 4 to page 18, line 3, of the specification), the use of multiple variable current sources allows for new functions such as selecting a *different* level of current to provide to each individual component. This in turn allows for considering the individual characteristics of each element when compensating for possible effects of temperature or power supply variations. Hence, the plurality of current sources in claim 2 is not analogous to the rejected claimed feature in *In re* Harza, where the plurality of ribs did not provide for any new functions beyond what a single rib could provide.

With regard to claim 3, Applicant believes that none of the cited references teach or suggest "*a terminal for receiving a changeover signal and said variable current source steps the variable current up or down to any of prescribed different currents in accordance with the changeover signal received at said terminal*". Nevertheless, the Examiner has argued that the reset terminal 91 for receiving a reset signal of Hironaka et al. meets the limitations of claim 3. However, based on Applicant's review of Hironaka et al., Applicant disagrees with the Examiner in this regard.

The reset terminal of Hironaka et al. is merely used to switch the device from a "rest" mode to a "standby" mode and thus, does not teach or suggest the features claimed in claim 3. (see column 6, lines 18-34 and column 7, lines 10-28 of Hironaka et al.). After initialization, the object detecting device of Hironaka et al. remains in a standby mode, (see column 7, lines 25-28 of Hironaka et al.), which is characterized by providing limited current to the various elements of the detection circuit (see column 4, lines 39-46 of Hirokana et al.). Also, optionally, after a single detection signal is generated in this standby mode, the Hironaka et al. device may enter a rest mode, which is similar to the standby mode but with the additional feature that output from the level monitor is ignored (see column 6, lines 18-28, of Hirokana et al.). In the rest mode, further detection signals will not trigger the wake-up response which means the device is essentially inactive (see column 6, lines 18-31 and column 4, lines 36-39 of Hironaka et al.). The reset signal allows the device to re-enter standby mode and generate a new wake-up signal upon a new detection event. The reset signal that transitions from the rest mode (i.e. limited current and no level monitoring) to the standby mode (i.e. limited current with level monitoring) does not cause the variable current source to step the variable current up or down. Hence, the variable current remains the same during the process.

Therefore, it is clear that none of the cited references teach or suggest the features of claim 3 (i.e. "*a terminal for receiving a changeover signal and said variable current source steps the variable current up or down to any of prescribed different currents in accordance with the changeover signal received at said terminal*") which allows the variable current sources to be controlled by current changeover circuit 11, adjusting the variable current in response to various factors, including but not limited to temperature variance or fluctuations in the available power supply (see page 13, lines 6-7, and page 17, line 10 to page 18, line 3, of the specification). By contrast, the terminal and changeover signal taught in the cited references does not adjust the variable current, but merely transitions from one low-current state to another. Thus, even based on the combined teachings of the cited references, it would not have been obvious to one skilled in the art to add a terminal as recited in Applicant's claim to achieve this new functionality. Hence, for at least these reasons, claim 3 is patentable over these references.

With regard to claim 4, the Examiner has argued that Hironaka et al. teach adjusting the variable current based upon the output of a voltage amplifier which the Examiner believes, read on the limitations of claim 4. However, Applicant also disagrees with the Examiner in this regard. The voltage output from one of the circuit components is not the power voltage but rather, the power voltage refers to the voltage provided to drive the elements of the circuit such as the voltage from a battery or other external power supply (see, for example page 17, line 10 to page 18, line 3, of the specification).

Accordingly, for these reasons, Applicant respectfully submits that claims 1-4 and 6 are patentable over the cited references, and requests that this rejection under 35 U.S.C. 103(a) be withdrawn.

Claim 5 is rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Hirokana et al., Takada et al., and North in further view of Butler (U.S. Patent No. 6,730,909). Applicant respectfully traverses this rejection.

The Examiner argues with regard to claim 5 that Butler teaches adjusting a bias current to compensate for temperature variations in an infrared detector which the Examiner believes reads on the limitations of claim 5. However, it is important to emphasize that the teachings of Butler are limited to compensating for temperature variations in the pyroelectric component. In contrast, the recited claim features of claim 5 can correct for the effects of temperature variation on any circuit components (as described on page 2, line 16 to page 3, line 2, of the specification) by adjusting the variably supply voltage to each circuit element individually.

Accordingly, for this reason, Applicant respectfully submits that claim 5 is patentable over the cited references, and requests that this rejection under 35 U.S.C. 103(a) be withdrawn.

As indicated in the Office Action, claims 7, 9, 10, 12 and 13 are objected to as being dependent upon a rejected base claim but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claim 7 has been amended in this manner and, as a result, claims 7, 9, 10, 12 and 13 are now in condition for

allowance. Further, claims 8 and 11 have been amended to overcome the rejection 35 U.S.C. §112, second paragraph, and now should also be in condition for allowance.

CONCLUSION

For at least the foregoing reasons, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue. If the Examiner has any comments or suggestions that could place this application in even better form, the Examiner is invited to telephone the undersigned attorney at the below-listed number.

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Respectfully submitted,

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